

## Holistic Orchard Spray Rates and Sources

Originally Compiled by Ethan Russo, who has been using the Holistic Orchard spray successfully on Vashon since 2012. The document has been modified and expanded by Diane Emerson. The information has been adapted from Michael Phillips's book *The Holistic Orchard*. This handout was last updated on March 22, 2018.

**Basic Holistic Organic Spray Mixture:** Phillips refers to this as “Neem Oil, Fish, and Microbes”. He also refers to this as the “Four Holistic Spring Sprays”, when he discusses timing.

| Ingredients                           | Notes  | Cost   | Recipe  | Recipe                             | Recipe                             | Recipe                            |
|---------------------------------------|--|--|---|------------------------------------|------------------------------------|-----------------------------------|
|                                       | <b>4 Gallon backpack Sprayer</b>   | <b>Diane's Cost, including shipping</b>  | <b>4 Gallon Recipe</b>  | <b>3 Gallon Recipe</b>             | <b>2 Gallon Recipe</b>             | <b>1 Gallon Recipe</b>            |
| <b>Sprayer</b>                        | Dr. Russo recommends a Chapin Electric Rechargeable  | <b>\$146 for Chapin Rechargeable 4 Gallon capacity</b>   |   |                                    |                                    |                                   |
| <b>Pure Neem Oil</b>                  | Use a 1% concentration for the first (¼ inch green) spray and then 0.5% concentration for the rest of season | <b>\$38.39 for 1.7 quarts</b> (1609 ml, 86 gallons of spray)                                     | <b>5 Tbs (2.5 oz.) (75 ml)</b> for 0.5% concentration of Neem Oil | <b>4 Tbs (2.0 oz.) (60 ml)</b>     | <b>8 tsp (2 +2/3 T) (40 ml)</b>    | <b>4 tsp (20 ml)</b>              |
| <b>Dr. Bronner's Liquid Soap</b>      | mixed with straight neem oil   | <b>\$4.20 for an 8 oz bottle purchased in bulk at Thriftway</b> 237 ml, for 158 gallons of spray | <b>1.25 tsp (6 ml)</b>  | <b>1 tsp (4.5 ml)</b>              | <b>0.75 tsp (3 ml)</b>             | <b>0.38 tsp (1.5 ml)</b>          |
| <b>Liquid Fish Extract Hydrolized</b> | Hydrolizing greatly reduces fish smell   | <b>\$26 for 32 oz, 1 qt</b> which can make 13 gallons of spray                                   | <b>1.25 cup (10 oz. ) (300 ml)</b>                                | <b>1 cup (8 oz) (225 ml)</b>       | <b>10 Tbl (5 oz. ) (150 ml)</b>    | <b>5 Tbl (2 ½ oz) (75 ml)</b>     |
| <b>Effective Microbes</b>             | (aka Mother Culture) Dr. Russo says an alternative is Compost Tea  | <b>\$35 for 1 qt, 32 oz</b><br>Makes 25 gallons of spray   | <b>¾ Cup (6 oz ) (177 ml)</b>                                     | <b>½ Cup (4.5 oz) (130 ml)</b>     | <b>6 Tbl (3 oz) (89 ml)</b>        | <b>3 Tbl (1.5 oz) (44 ml)</b>     |
| <b>Organic Blackstrap Molasses</b>    | <b>Add soap to molasses first, then dissolve in warm water</b>   | <b>\$8.79 for 16 oz</b><br>32 Tablespoons, or 32 gallons of spray                                | <b>¼ Cup 4 Tbs (59 ml)</b>  | <b>3 Tbl (45 ml)</b>               | <b>2 Tbl (30 ml)</b>               | <b>1 Tbl (15 ml)</b>              |
| <b>Warm, non-chlorinated Water</b>    | Small Amount needed to work with the molasses, and the rest in blend and sprayer. No warmer than 120 Deg F.  | <b>\$0.</b> I used a Brita Water filter. May need to remove chloramine as well as chlorine.      | Amount to make up 4 gallons                                       | <b>Amount to make up 3 gallons</b> | <b>Amount to make up 2 gallons</b> | <b>Amount to make up 1 gallon</b> |

|                                     |  |  |                      |                        |                         |                        |
|-------------------------------------|--|--|----------------------|------------------------|-------------------------|------------------------|
| <b>Liquid Kelp Extract, Seaweed</b> | Dried seaweed<br>OK too  | <b>\$15.75 for 1 Qt (64 T)</b> which makes 51 gallons of spray | <b>5 Tbs (75 ml)</b> | <b>¼ Cup (60 ml)</b>   | <b>2.5 Tbs (40 ml)</b>  | <b>7.5 tsp (20 ml)</b> |
| <b>Yucca Spreader-Sticker</b>       | Not mentioned in Philip's book. Dr. Russo uses it, though  | <b>\$15 for 1 Qt,</b> which makes 768 gallons of spray         | <b>1 tsp (5 ml)</b>  | <b>¾ tsp (3.75 ml)</b> | <b>1/2 tsp (2.5 ml)</b> | <b>¼ tsp (1.25 ml)</b> |
|                                     | Buying in bulk, buying locally, and fermenting the effective microbes can all help reduce the cost. Fish is left out after June. | <b>\$289 total. Without sprayer, \$143</b>                     |                      |                        |                         |                        |

1 quart = 946 ml = 64 TBL = 192 tsp

4 gallons of spray = 15142 ml

Google has a great conversion tool

## Timing

According to Dr. Russo, Basic Holistic Organic Spray Mixture can be used every two weeks throughout the season (to mid September on Vashon). The hydrolyzed fish is omitted after June. Michael Phillips suggests that herbal teas be added in late spring and summer (especially horsetail, comfrey and nettles).

Phillips gives the following timing for the basic spray:

- 1) Week of Quarter-inch Green. Buds are showing solid green tissue, somewhere between green tip and half-inch green.
- 2) Early Pink. Leaf tissue has filled out considerably at the base of blossoms, with the first smile of pink revealing itself. Don't spray on open king blossoms.
- 3) Petal Fall. Spray to the point of runoff.
- 4) First Cover. 7-10 days following the petal fall application.

## Equipment and Ingredients – More Details

---

### Sprayer

The Chapin Electric Backpack Sprayer is recommended, <https://www.provantage.com> for \$131 plus shipping = \$146. This will get up into the tops of large fruit trees; up to 20 feet. Ebay was more expensive.

**Pure Neem Oil:** Buy enough to last a year. If you buy in bulk, store it in the fridge, pre-measured in small jars. Before spraying, melt in water bath, mix with organic soap, and then add to very warm filtered pure un-chlorinated water (but below 120 degrees F.) Do not buy neem oil pre-mixed with any other ingredients. It needs to be pure neem oil.

Sources:

1. **Neem Oil** from Ahimsa Organics, \$83/gal.

<http://www.neemresource.com/Neem&KaranjaOil.html>

**2. Organic Neem Oil** from Essential Wholesale, <https://www.essentialwholesale.com> Diane purchased 3.5 lb (1.7 quarts) for \$38.39

**Dr. Bronner's Liquid Soap:** Available in bulk at Thriftway. Dr. Russo likes rose, almond or hemp. 8 oz bottle purchased in bulk at Thriftway, for \$4.20.

**Liquid Fish (not fish emulsion!)** Liquid fish must be cold-processed hydrolyzed products. You will know if it is the right kind of fish by its smell. Cold-processed fish does not smell. Each gallon provides 13 backpack sprayer treatments. Omit the fish in the blend after June. This will reduce the cost of the spray.

Here is a link that describes the difference between the two types of fish fertilizer:  
<https://www.neptunesharvest.com/emulsions.html>

Sources:

**1. Neptune's Harvest Fish:** [www.growitnaturally.com](http://www.growitnaturally.com) Diane paid \$26 total for 1 quart of (it was on sale at the time)

**2. Pacific Gro,** processed in Raymond, WA: <https://www.pacificgro.com/> \$39 for a gallon, delivered. Quarts not available. "We have been a leader in the cold-process enzymatic digestion of fish scrap for over 13 years. In 2013 we developed a process to include crab shell and shrimp shell in a liquid fertilizer. This combination of fish, shrimp and crab has proven so bio-active in the soil, and so rich in diverse nutrients, that it's become recognized as **far superior to** fish fertilizer or **fish hydrolysate**. And cheaper."

## **Effective Microbes, aka Mother Culture:**

Effective microbes may be used as is from manufacturer, or home fermented in a jug with a vapor lock to extend supply. The effective microbes can be fermented further into many, many gallons. Directions for doing this are in *The Holistic Orchard*, page 140.

Sources for Effective Microbes:

**1. ProBio Balance Original** from SCD Probiotics: <https://www.scdprobiotics.com/> 1 liter for \$23.99 plus \$17.58 shipping. 1 gallon for \$59 plus shipping.

**2. EM-1 probiotic** from TeraGanix: <https://www.teraganix.com/>. I Ordered 1 Qt for \$35 including shipping, 1 Gallon is \$75, including shipping. With this particular product, one can use less: 1 oz per gallon, instead of 1.5 oz per gallon, if you wish. Info on ingredients:

EM-1 Microbial Inoculant is a naturally fermented live microbial product for soil conditioning and plant foliar applications. EM-1 Microbial Treatment is a safe alternative to synthetic chemicals that can be used for all plants, soils, cut flowers, fish ponds, composting, and deodorizing that is completely non-toxic and safe for humans, animals, and the planet. ACTIVE INGREDIENTS: Microorganisms: 1 million colony forming units/cc (units/ml), 1%: Lactobacillus plantarum, Lactobacillus casei, Lactobacillus fermentum, Lactobacillus delbrueckii, Bacillus subtilis, Saccharomyces cerevisiae,

Rhodopseudomonas palustris. Not all microbes are listed on the actual label. INACTIVE

INGREDIENTS: 96% Water and 3% Molasses

Directions: Do not store EM 1 in direct sunlight. Store in closed container at room temperature. Do not freeze.

**3. Compost Tea** as an Alternative to Effective Microbes *“The life diversity found in the compost pile can be employed to do similar work.” “But the tea must be aerobic, and kept at the correct temperature for the beneficial microorganisms.”* Michael Phillips

**4. Plant Success Organics Soluble™** available at Ace. Diane has not checked it out yet with Michael Phillips, but it looks promising:

**Guaranteed Analysis:**

Total Nitrogen (N) 0.5%

0.2% Water Soluble Nitrogen

0.3% Water Insoluble Nitrogen

Available Phosphate (P<sub>2</sub>O<sub>5</sub>) 0.1%

Soluble Potash (K<sub>2</sub>O) 7%

Derived from: Ascophyllum Nodosum (seaweed extract)

**ALSO CONTAINS NON-PLANT FOOD INGREDIENTS:**

20% Humic Acids derived from leonardite

**Mycorrhiza – 1,624,266 (propagules per gram)**

**Ectomycorrhiza**

Pisolithus tinctorius – 1,100,000 props/gram

Rhizopogon luteolus – 44,000 props/gram

Rhizopogon fulvigleba – 44,000 props/gram

Rhizopogon villosullus – 44,000 props/gram

Rhizopogon amylopogon – 44,000 props/gram

Scleroderma cepa – 72,600 props/gram

Scleroderma citrinum – 72,600 props/gram

Suillus granulatus – 145,000 prop/gram

Laccaria bicolor – 29,000 prop/gram

Laccaria laccata – 29,000 prop/gram

**Endomycorrhiza**

Glomus etunicatum – 14 props/gram

Glomus intraradices – 14 props/gram

Glomus mosseae – 14 props/gram

Glomus aggregatum – 14 props/gram

Glomus clarum – 2 props/gram

Glomus deserticola – 2 props/gram

Glomus monosporum – 2 props/gram

Gigaspora margarita 2 props/gram

Paraglomus brazilianum 2 props/gram

**Bacteria**

Bacillus licheniformis – 1,700,000 CFU/gram

Bacillus megaterium – 1,300,000 CFU/gram

Bacillus pumilus – 1,300,000 CFU/gram

Bacillus azotoformans – 1,100,000 CFU/gram

Bacillus coagulans – 1,100,000 CFU/gram

Bacillus thuringiensis – 1,100,000 CFU/gram

Paenibacillus polymyxa – 1,100,000 CFU/gram

Paenibacillus durum – 1,100,000 CFU/gram

Azotobacter chroococcum – 1,100,000 CFU/gram

Saccharomyces cerevisiae – 1,100,000 CFU/gram

Pseudomonas aureofaciens – 1,100,000 CFU/gram

Pseudomonas fluorescens – 1,100,000 CFU/gram

Bacillus amyloliquefaciens – 600,000 CFU/gram

Bacillus subtilis – 175,000 CFU/gram

#### **Trichoderma**

Trichoderma koningii – 400,200 CFU/gram

Trichoderma harzianum – 266,800 CFU/gram

## **Blackstrap Molasses:** Wholesome Sweeteners Organic Molasses

Blackstrap molasses is extremely viscous and should also be dissolved in warm water prior to adding to mix. Must be unsulfured molasses. Diane paid \$8.79 for 16 oz, including shipping, from E Bay. Minglement carries it too, in 2 sizes.

## **Chlorine Free Warm Water**

Heat to just under 120 degrees F or 50 degrees C

Diane used a Brita filter to remove chlorine from tapwater supplied by Heights Water. If you have a well, use the well water as is.

## **Liquid Kelp Extract, Seaweed, (dried OK too)**

No specific species mentioned. They all help plants increase their disease resistance.

Sources:

**1. Seaweed Plant Food (aka Liquid Seaweed)** from Neptune's Harvest, recommended by Dr. Russo. \$46/gal. Each gallon provides 51 backpack sprayer treatments of 4 gallons each. Country Store carries it in quart size. \$17.75 per quart.

**2. Organic Kelp** E Bay: I purchased 1 quart of liquid organic kelp on EBay for \$15.75 including shipping. Source: Age Old Organics, <http://www.ageold.com/about-us/> Their product is made from Ascophyllum nodosum, knotted kelp. This was before Country Store had theirs in stock.

OR, Soluble Seaweed Powder, *This is the best cost option, and OK by Phillips.*

**3. Maxicrop Soluble Seaweed Powder.** At 1 tsp per gallon, the 10.7 oz bag of powder will make up to 65 gallons of product. Now available at Country Store for \$14.99. Ascophyllum nodosum.

**Yucca Spreader-Sticker:** Not mentioned by Michael Phillips, but used by Dr. Russo, so I include it too.

Sources:

**1. Therm X70 Yucca Extract**, \$29.99/quart plus shipping = many, many treatments It is also used to prevent build up in drip lines emitters: For preventing buildup in drip lines, apply 2 oz/acre weekly. <http://www.groworganic.com/therm-x70-yucca-extract-quart.html>

**2. Nectar For the Gods Hygeia Hydration Yucca Extract.** I Purchased 1 quart for \$15 including shipping from E Bay. "Rich in saponins, Yucca acts as a wetting agent to aid in root penetration for maximum nutrient uptake. The organic acids in Yucca contribute to chelation of other nutrients, making them more available to microbes and to your plants. You can also use Hygeia's Hydration as a wetting agent for foliar feeding nutrients, pest control, and fungal sprays."

**Other organic agents for orchardists to consider. Details in *The Holistic Orchard***

|   | <b>4 Gallon</b>                 | <b>2 Gallons</b>               | <b>1 Gallon</b>                 | <b>½ Gallon</b>               | <b>1 Quart</b>               |
|---|---------------------------------|--------------------------------|---------------------------------|-------------------------------|------------------------------|
| <b>Kaolin Clay</b>                      |                                 |                                |                                 |                               |                              |
| <b>Monterey Insect Spray (Spinosad)</b> | <b>8 oz<br/>(240 ml)</b>        | <b>4 oz<br/>(120 ml)</b>       | <b>2 oz<br/>4 Tbs (60 ml)</b>   | <b>1 oz<br/>2 Tbs (30 ml)</b> | <b>1 Tbs<br/>(15 ml)</b>     |
| <b>Serenade (organic anti-fungal)</b>   | <b>8-16 oz<br/>(240-480 ml)</b> | <b>4-8 oz<br/>(120-240 ml)</b> | <b>2-4 oz<br/>(60-120 ml)</b>   | <b>1-2 oz<br/>(30-60 ml)</b>  | <b>½-1 oz<br/>(15-30 ml)</b> |
| <b>Safer Soap</b>                       | <b>10 oz<br/>(300 ml)</b>       | <b>5 oz<br/>(150 ml)</b>       | <b>2.5 oz<br/>5 Tbs (75 ml)</b> | <b>1.25 oz<br/>(38 ml)</b>    | <b>4 tsp<br/>(19 ml)</b>     |
| <b>Actinovate (antifungal)</b>          | <b>8 tsp<br/>(40 ml)</b>        | <b>4 tsp<br/>(20 ml)</b>       | <b>2 tsp<br/>(10 ml)</b>        | <b>1 tsp<br/>(5 ml)</b>       | <b>½ tsp<br/>(2.5 ml)</b>    |
| <b>Liqui-Cop</b>                        | <b>See</b>                      | <b>Directions</b>              | <b>for</b>                      | <b>Each</b>                   | <b>Crop</b>                  |

Here are additional resources to help answer your questions:

1. The Holistic Orchard Network: <https://www.groworganicapples.com/>
2. *The Holistic Orchard* book by Michael Phillips
3. Dr. Ethan Russo's presentation of his own experience using these methods on his Vashon orchard: <https://www.youtube.com/watch?v=ce9USxe07MU&feature=youtu.be>
4. Diane Emerson: DianeEmerson@yahoo.com 206-567-5492

This research and handout is sponsored by the Vashon-Maury Island Groundwater Protection Committee and King County, to protect our island's sole aquifer, and all who depend upon it.